SPATIUM
No. 50, December 2023, pp. 24-32

UDC 711.4:502.131.1
Original scientific paper
DOI: https://doi.org/10.2298/SPAT230407010O

ANALYSIS OF ARCHITECTURAL URBAN SPACES BASED ON SPACE SYNTAX AND SCENARIO METHODS

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The article aims to examine the scenario design process, with the goal of creating an architectural environment with a better perception of urban spaces. Space analysis and generalization of the plot structure of films, as well as their types and genres, which correlate with the plot composition of the urban architectural space and spatial syntax, were used as an approach in the study. This made it possible to investigate the relationships between spatial planning and a number of social, economic and environmental phenomena. As a result of studying the plot composition of a film, it was established that its structural elements and the features of those elements can be used to analyze the architectural environment, in order to study its plot structure based on configurational models of space. Thus, the legitimacy of using cinematographic analysis for the analysis of the architectural environment was confirmed. The plot structure of the architectural environment of the city is understood as its urban structure, which, like in cinematography, can develop linearly, i.e., from the beginning of the route to the end point along one line of a street, or be more complex (non-linear), whereby all elements are placed in an arbitrary order. In cinematography, the idea of the film organizes the plot and sets the formula for the finale; however, in the architectural environment, a person, moving in the city, perceives this environment through the spatial and temporal aspect that has developed historically. Hence, the architectural and artistic appearance of the city is of crucial importance.
***Key words*: theory of architecture, design paradigms, architectural environment, perception, plot, public spaces, configurational models, spatial analysis, sustainability.**

INTRODUCTION

In New York in September 2015, the Post-2015 Development Agenda was approved at the 70th session of the UN General Assembly and the UN Summit on Sustainable Development. The final document of the Summit "Transforming our world: the agenda in the field of sustainable development until 2030" approved 17 Sustainable Development Goals and 169 tasks. It states that truly sustainable development is impossible without observing human rights. The modern meaning of sustainable development is much broader in terms of the basics of development, in addition to ecological, socio-economic and socio-humanitarian components (United Nations, 2020). The Global Report on Culture for Sustainable Urban Development, prepared by UNESCO in the 2030 Agenda for Sustainable Development, states that culture is inextricably linked to public spaces. Public spaces serve as the basic structure for the urban landscape and reflect the history and cultural diversity of a society, while promoting social diversity (United Nations, 2020).

According to the definition of the Council of Europe, an open space "is an important part of the urban heritage, a strong element of the architectural and aesthetic form of the city, [it] plays an important educational role", it also "...plays an important role in meeting the recreational and leisure needs of the community and has economic value in improving the environment" (Council of Europe, 1986). Therefore, to achieve the goals of sustainable development, UNESCO proposes using a landscape approach in order to identify and preserve historic areas, along with their spatial organization and natural features. This includes "open spaces and gardens; land use methods and spatial organization; peculiarities of perception and visual relations, as well as all other elements of the urban structure" (Royal Danish Academy, 2020). Consequently, sustainable development currently includes the preservation of cultural values such as the image of the city and its architectural monuments.

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Until the end of the 19th century, people shared their impressions about the urban environment during walks or in the newspapers of the time. Such walks were opportunities to exchange and share opinions. A person (especially his/her clothes, gait, manner of behavior) was perceived as an integral part of the urban environment, no less important than new residential buildings, public catering establishments, or spectacular buildings. Life in the city was a kind of theater, with each person being both a spectator and an actor at the same time.

Everything changed with the invention of photography, which helped not only to confirm one's history, but also reproduce, distribute and, most importantly, preserve impressions. Photography has been a continuous process since the invention of the daguerreotype. The desire to create moving images hastened the invention of the cinematograph, which became a much greater reproducer of impressions than photography and painting. Not only did it set many static photographs and other images in motion, but it also taught humanity a new "vision" and understanding of certain visual codes previously unknown. The movement of the film camera best imitates the motions of the eyes, the turn of the head and the whole body of a person, imitating movements of the human body in space, in contrast to the static perception and contemplation of painting and photography. Film not only captures and conveys the surrounding world, but also, thanks to the montage of shots, it creates something that never happened and does not seem real. In this sense, an architectural project executed on paper resembles a cinematograph until its implementation. Therefore, the study of the architectural environment by cinematographic methods is legitimate.

Cinematography has taught a new vision, i.e., the ability to recognize objects depicted on the screen based on minimal information about them and the absence of a coherent image, and to perceive the transition from frame to frame as a connected narrative. Such an artificially created reality has become more spectacular, brighter, and mobile, like in Hollywood movies. The era of total computerization began in the 1990s in Western European countries and the USA, and in the 2000s in Ukraine. Therefore, the rapidly developing e-culture has turned computers into universal carriers of culture, leading to the creation of new forms of unreal life – virtual worlds and computer games. This marked the beginning of the process of rethinking the formats and genres of photography and cinema, as well as the transformation of the entire visual language, which is already familiar to cinemagoers. The entire aesthetic paradigm has changed, and everyday life has been transformed, moving towards spectacle.

Thus, the cinema became the prototype of modern multimedia, despite the fact that the film embodies the linear order of a narrative presentation. Meanwhile, the new media are completely subordinated to the "human-centric" model of representation, that is, their time is at the disposal of a person. Thanks to digital gadgets, people can easily and quickly access any data, and reproduce it in any order. The usual linear time can now be controlled: compressed, stretched, speeded up, or inserted with some events, etc. Moreover, users interact not with a computer, but with culture encrypted in digital form, according to Lev Manovych (2001). All this cannot fail to affect the perception of the entire surrounding environment and the architectural environment of the city.

Under the influence of new media, people, especially children and young people, develop a need for the spectacle of this surrounding world. The reaction to this situation can be considered the bright decoration of cities in unusual designs. For example, once festive, illumination becomes an everyday occurrence, with installations and performances being widely used in the streets, squares and parks of cities. Furthermore, the simplification of the architectural form of buildings is observed, which is dictated by the attitude to the wall as a large cinema or computer screen for the demonstration of moving images, as well as the use of media facades, etc. Thus, virtual space is increasingly penetrating the real urban environment since the boundaries between the real and the virtual are leveled more and more. The interactivity of virtual worlds on screens can already be considered a key cultural form of the 21st century. A new language, as well as signs, symbols and, accordingly, codes are emerging, which still need research.

The feasibility of studying the architectural environment using cinematographic methods has been proven in previous publications (Troshkina, 2015; 2016; 2017; 2020). Therefore, new media are forerunners of a large-scale process of cultural reconceptualization, since they have generated an artificial symbolic system. As a result, the spectacle of the architectural environment of the city is created. Thus, numerous studies of the architectural environment in recent years are not final and complete, as they have little to do with the modern city, which under the influence of new media has become cinematic and interactive.

In addition, cinematography simulates cognitive processes because the movement of the camera replaces the real movement of the body in space and, therefore, reproduces the process of perception of the environment that is closest to real life. In this process, it is important that the impression of the architectural environment, architectural objects and their elements can be programmed, built, and predicted in terms of the plot, like in the script of a movie. Thus, the purpose of this article is to study cinematographic methods of plot composition for use in analyzing the plot structure of the architectural environment and the formation of its perception scenario.

MATERIALS AND METHODS

When studying the plot structure of the architectural environment, a systematic approach was used. This approach was manifested in the analysis and synthesis of the plot structure of movies, their types and genres, which correlate with the plot composition of the urban architectural space and spatial syntax. Thus, within this person-oriented approach the relationships between spatial planning and a range of social, economic and environmental phenomena were explored. In order to analyze the plot structure of the architectural environment and "write" a script for its perception, it was necessary to learn how film scriptwriters do it, to research

their methods and techniques. Therefore, the film paradigm of Sid Field (2007) – a famous Hollywood screenwriter – was taken as a basis for the analysis. It is defined as a "model, sample, conceptual scheme". Its essence is that every second of the film the viewer should think: "I wonder what will happen next?" Accordingly, the entire script of the film is built to meet this requirement. It is also very important to ask this question in the formation of the architectural environment, especially for the scenario of its visual perception, since certain impressions should be programmed in order to build the environment perception scenario (Figure 1).

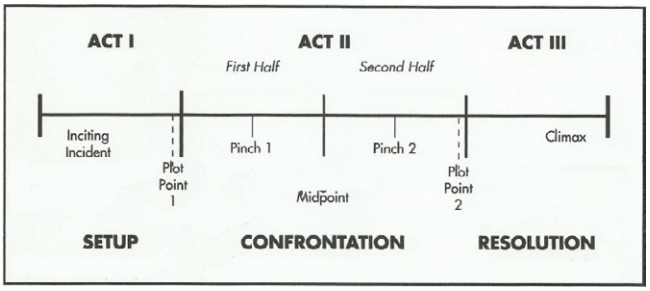

Figure 1. A graphic representation of Sid Field's film paradigm (Source: : Field, S. (2007). Script – the basics of screenwriting. New York: Random House Publishing Group, p. 336)

In the process of its development any architectural environment has the following elements: an input/output part corresponding to a cinematic tie; the middle of the route, perhaps its goal (confrontation in cinema); and the exit from the environment or reverse movement (dissolution). The development of events in the film is facilitated by the so-called "plot pushers" of the plot that "warm it up" and give it new directions of development. Such a cinematic approach to the architectural environment should interest a person and encourage them not only to move further, but also completely absorb their attention, consider the elements and, in general, understand and "include" the surrounding space (Oliynyk, 2021). However, the movement of a person in space is not an isolated phenomenon. It consists of many other components that affect the perception of the environment in one way or another, which are partially described by the theory of spatial syntax, based on the relationship between space and society (Hillier, 2007).

Hillier (2007) and Oliynyk (2020) proposed a method of analyzing spatial configurations that can be used for different fragments of the urban structure. They noted that architectural environments, from the point of view of spatial and formal organization, can be considered configurational entities. It is through the spatial configuration that social goals are expressed. Therefore, configuration is a defining component of architectural and urban planning, because it takes into account all possible relationships and the simultaneous influence of a complex of entities on each other through these relationships (Hillier and Tzortzi, 2006).

The model of spatial integration in spatial planning correlates to a certain extent with a traffic schedule. The main strategy of the syntactic method is analysis of the configurational properties of the spaces that make up the plan, and with its help, the key structural features of the plan can be identified (Tranchik, 1986). To determine the compositional structure and the ratio of transit and stationary spaces, a method of spatial analysis based on the improvement of the "figure-background" theory is proposed. Using the method of spatial syntax, the structures of public spaces of historical cities were investigated. It was found that the degree and nature of movement along the street is determined by how the street is embedded in global and local networks. Similarly, the functioning of public squares is determined not only by how their space is limited by surrounding buildings, but also by how it is spatially embedded in a larger system of space. That is, not only does the configuration of public spaces affect their functional use and directions of movement, but also the relationships between neighboring spaces forming a network. Thus, what happens in any individual space (a room, a corridor, a street or a public space) is fundamentally influenced by the relationship between this space and the network of spaces with which it is connected.

RESULTS

Since cinema is an image that moves, the analysis of the plot composition of the architectural environment also involves the movement of the viewer/consumer in it, both directly (physical-muscular) and visually (gaze). Therefore, in order to fully perceive the environment, a person must not only be in it, but also move, i.e., first enter, then move, and discover gradually, angle by angle, view by view, the complex space of the object, or a part of the urban space, which successively forms an image in the mind. In this process of movement, a person seems to "experience" space and time, and the environment serves as large-scale theatrical scenery.

A film composition is made up of the following components: the structure, plot, plot-line and architectonics of the film. Structural composition is the division of a film into shots, scenes and episodes. In this study, we consider plot types for the composition and find their projections in the architectural environment. The plot composition can be *linear*, when all events take place in time from the past to the future (exposure → opening → development of the action → climax → denouement → finale) or *non-linear*, when for the sake of the author's intention the events are presented in an arbitrary order. Thus, if we imagine that from the beginning of the movement to the end point of the route in the city, a person has only one option, a one-line-street, a straight line connecting the beginning and the end, then we will get a model of the linear composition of the city as its main storyline.

Cinematographers distinguish the following elements of a linear plot composition: exposition, tie-in, action development, climax, denouement, finale (Korshunov, 2015). The entrance to the environment, the point from which the movement begins, can be any location of a person, at this particular moment (for example, one's apartment, the yard of a residential building, a street, a shop, a square, etc.). Someone's initial point of entry into a space can be compared with the exposition of the plot. In the cinema, exposition indicates the personal characteristics of the protagonists and their relationships with each other. The architectural environment is also capable of the same, because an everyday periodic or episodic stay in a certain space can already be considered a certain marker of human

personality, and even the level of culture or education. Let us consider that a person is in a certain architectural environment (for example, their own apartment) and they have a certain goal (for example, to reach the city square, where a festive mass theatrical event is taking place). Therefore, the person starts moving from the apartment and, the first point of the route is the yard. There are contacts with neighbors, as a result of which there may be a short-term traffic delay. This moment can be compared to the cinematic ending of the plot composition.

The longest cinematic element in terms of time is the development of the action. In terms of town planning, it corresponds to street traffic. Architectural objects arranged in a rhythmic sequence correspond to cinematographic strikes and counterattacks, which intensify as the culminating point approaches – the city square. Indeed, the city center often coincides with its historical area, which becomes "diffuse", losing historical objects and mixing with modern buildings. On the other hand, when moving in the direction from the periphery to the center, the number of historical buildings and other architectural accents increases. This can be compared to the growth of dominant tension in the urban environment.

The culmination of the architectural environment can be a city square, a public space, or any other point with increased conflict tension that can be created by incorporating a new form into the existing historical environment. This environment should include a sharp contrast between the historical and modern buildings of the city, where one is replaced by another in the so-called "threshold spaces" (Kopteva, 2009). Walking against, leaving/entering a large shopping center built over the entrance/exit of a transport hub, and the need to contact strangers can also be seen as conflict situations. Unexpected plot twists contribute to strengthening the climactic situation, both in the cinema and in the urban environment, which are like hooks (according to Field) that catch the attention of viewers, keeping them in front of the screen because they should be interested in what will happen next.

Several types of hooks are used in the cinematographic script, namely: hindrance, threat, mystery, and news (Korshunov, 2015). All of them can exist in an architectural environment, but we note that they "work" best when the viewer enters the environment for the first time, for example, as a tourist, or taking his/her guests on an excursion or tour of the city, thus perceiving a familiar space through their eyes, or when a person has not been in a certain part of the city for a long time and has just noticed the changes that have taken place. A usual environment, in which a person remains with a specific goal, does not give such an effect.

Cinematic denouement can be interpreted as the achievement of a goal in the environment, i.e., the viewer has arrived at the place after the tension he/she experienced at the climax of the action. This exit can be perceived as an exit to a square, viewing platform or any open space after the narrow, confined, directed space of the street. The connotative meaning of resolution is liberation, a happy resolution of events, understanding of how to proceed in this situation, or a happy end after tension. The open space is a stopping point at which traffic subconsciously stops, even when the space is only a transit point on the route. The final destination is the ultimate goal of the route. As in the cinema, everything can end here – it is a kind of stop point at which the movement ends. However, at the end point, a person often either changes the route or starts moving in the opposite direction. In this case, we can talk about an analogy with closed, open or dual cinematographic types of endings.

According to Oliynyk, *linear-axial* is the configurational model of public space, which demonstrates movement in a clearly fixed direction. This is a model characteristic of introverted societies and does not involve communication and interaction. It directs, determines and controls people's behavior (Figure 2a). Transferring Field's film paradigm to a linear-axial configuration model, we will get a scheme of the structure of the plot composition of an urban space (Figure 2b).

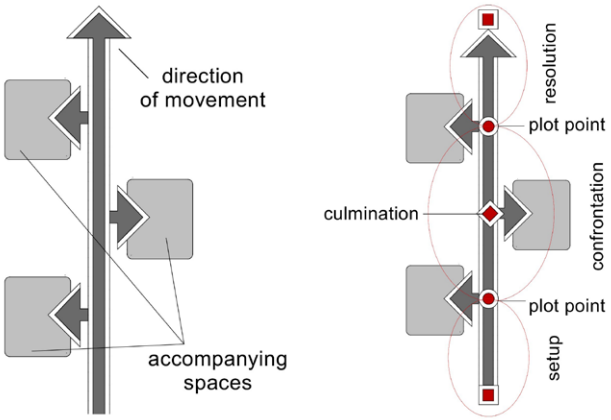

Figure 2. Linear-axial configurational model of public space: a) model; b) Structure of the plot composition of an urban space based on Field's film paradigm
(Source: Authors)

However, urban territory is organized in a much more complex way. Thus, it can have several districts, with squares, public centers and many blocks. Therefore, several story lines can exist in parallel in the city.

Plot-line composition is the division of the plot of the film into plot lines and leitmotifs, along with their relationship and connection. Urban storylines are separate parts of the city that can also: be in direct contact: be close to each other, i.e., touch through an intersection or a buffer area (for example, a park); be connected by a detail, i.e., an overpass or a bridge; flow into each other; or in contrast, never come into contact in any way. For example, residents of one part of the city are never in another part of the city without necessity, although they are well aware of its presence. In this case, the linear-axial configuration model of public space will have a variety – *linear-biaxial*, or even *branched axial*, in which there is a great freedom of choice of individual movement, and its determinism is reduced. However, there is no possibility of social contacts and joint activities, i.e., this is a more existential, individual model (Oliynyk, 2020, Figure 3).

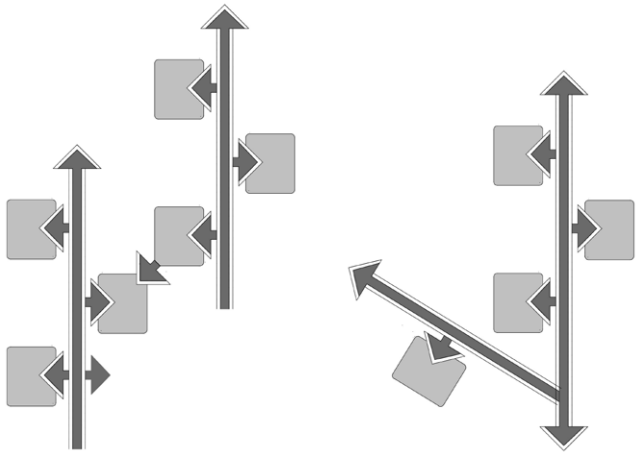

Figure 3. Varieties of the linear-axial model: a) linear-biaxial; b) branchial-axial
(Source: Oliynyk, 2020)

The central part of the city is the common part that unites it. It is considered "theirs" by all citizens, regardless of their place of residence, even in remote residential areas. It has its own history and a special architectural and artistic image that makes the city unique, which distinguishes it from other cities. In the center, in the place of culmination, all storylines, all highways, converge. The presence of an outstanding and iconic architectural object in a city strengthens the significance of it being a specific place for everyone without exception, and makes the city recognizable even for those who have never been there.

The central configuration model demonstrates the presence of a central, distributive space connected to the surrounding spaces, either directly or through intermediate linear spaces in the field of vision. Using linguistic or biological terms, we can call this method of inter-brain connections "agglutination" (Domin, 2012), i.e., gluing, sticking spaces together into a single system with a common center. According to Oliynyk (2021), such a model is characteristic of extroverted, democratic societies because it involves a constant return to the distributive core, communication and meetings (Figure 4).

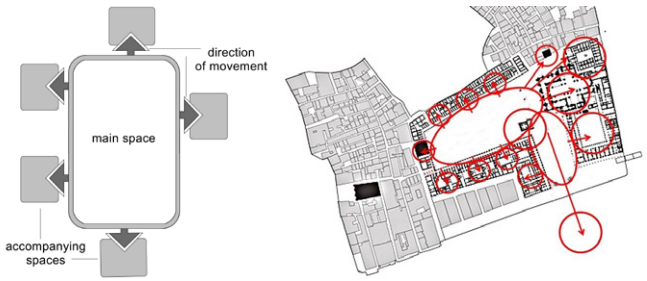

Figure 4. Centric configuration model of public space: a) model; b) San Marco Square
(Source: Oliynyk, 2021)

The *central model* can have a free, open space in the central core or include an additional object in its center. In addition, this model has a variety – centric-branched, in which a return from the side spaces to the main one is provided.

Architectonics is the division of a film into deep and meaningful parts. The elements of architectonics are the stages through which the development of the film idea passes. Architecture is usually built according to the Hegelian scheme "thesis – antithesis – synthesis", whereby the thesis is the main idea, the main semantic load, the antithesis is the opposition of another idea to the main idea, and the synthesis is the union of thesis and antithesis into a single whole resulting in a new quality. The term "architectonics" is fundamental to architecture and means the artistic expression of the work of structures. Recently, there have been scientific studies devoted to considering the visual architecture of the city and the problem of the visual organization of the urban space. In them, the richness of the visual urban environment as a whole entity is revealed through the architecture of the objective world in its individual parts. One main urban plot line can be considered a thesis, another – an antithesis, and their synthesis is the multifaceted nature of the urban architectural environment (Troshkina, 2020).

In all the types of plot, plot-line composition and architectonics of the film, time moves from the past through the present to the future. Similarly, the story unfolds from the beginning to the middle and further to the end in the form of a straight line. According to film experts, this happens in 90% of plots and films. However, authors sometimes break this tradition in order to implement their creative idea, and the events in the film are presented in an arbitrary sequence.

Film critic Korshunov (2015) investigated the peculiarities of non-linear composition in terms of the organization of artistic time in the script and film, discovering the connection between different concepts of time and types of composition. Thus, the linear concept of time (Middle Ages and Modern times) is characterized by *novel* (also episodic) and *elliptical* forms of linear plot composition. The first form is characterized by significant time gaps, and the second one is characterized by omissions of important elements of the story. In this way, viewers are invited to become co-authors, and are able to recreate any missed places. Non-linear types of film composition, like the linear ones, are also present in the composition of the architectural environment of the city. Thus, *novel (episodic)* and *elliptical forms* of linear composition, with time gaps and omissions of important elements, are characteristic of most cities from the post-Soviet space. Indifference to the preservation of historical buildings in general, and specific architectural objects in particular, has led to the loss of cities' significant fabric. As a result, we have a historical part of a city from the Soviet period, and a new modern building next to it. There is a significant time gap between them and there is no gradual transition from one era to another.

The same is the case with the omission of important elements in an *elliptical composition*, i.e., the loss of a historical object in a historical building, or some part of it, which affects the overall urban composition in one way or another. For example, this could be the loss of a park in front of a palace/manor and the release of the territory for later development or, on the other hand, the loss of the palace and the preservation of part of the park, which is included in a modern urban planning composition (Figure 5).

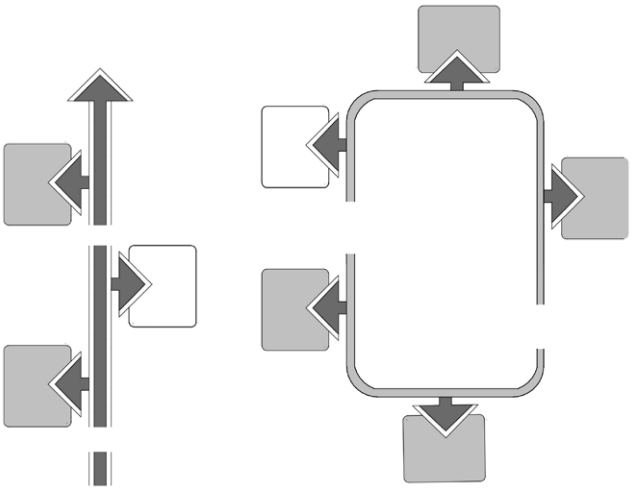

Figure 5. Elliptical composition of space: a) on the linear-axial configuration model; c) on the centric configurational model (Source: Authors)

The second *concept of time – eschatological* – also arose in the Middle Ages and means the idea of counting time not from the birth of Christ, but from the end of the world. The concept gave two forms of nonlinear composition of the plot, namely: *reversible, or reverse*, when time does not flow from the beginning through the middle to the end, but on the contrary, from the end through the middle to the beginning; and *inverse*, when some components of the narrative structure change their order. This composition of the plot is especially characteristic of modern television, whereby from the first seconds you need to interest the viewer with a teaser scene, often a culminating important event that will not allow you to change the channel, and then return to the beginning of the story. The eschatological composition – reversible and inversive – in the urban environment depends on the starting point of the route. It is possible to say that the viewer/consumer can live in a historical building in the main square of a city, where all the highways converge and all the important landmarks of the city are accessible, that is, the story composition begins with the climax, and only then do the other parts of the story occur.

The *cyclic concept of time* is the oldest. Time returns to the same thing, but in a new twist. The returns are the same thing, but there is no twist.

The ring composition in the city is indicated by the route itself, which starts and ends at the resident's place of living, for example, apartment → yard → street → office → street → yard → apartment. For a tourist, such a starting point can be a train station or a hotel (Figure 6).

Being very similar to the cyclical composition, the *frame composition* is also a return to the start, not only at the beginning and end of the film, but also several times in the middle. The function of the frame composition in retrospect is a reference to the memories of the main characters. In films, framing takes two forms. The first is in the form of a branched structure, resembling a trunk with branches, where the trunk is the main throughline of the story, and the branches are side lines. During the development of the plot, moving along the main trunk, we sometimes turn from it to

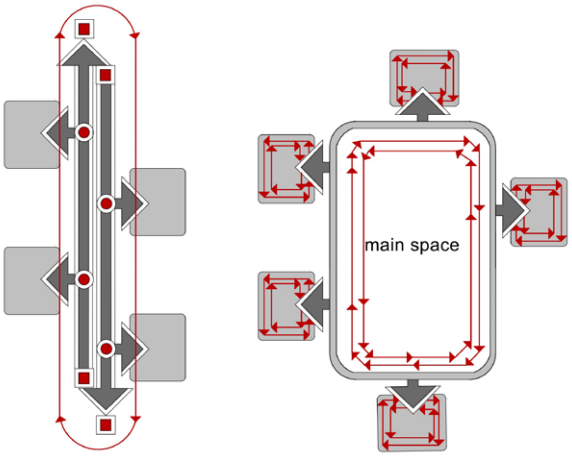

Figure 6. Cyclic (ring) composition of public space: a) linear-axial configuration model; b) centric configurational model: a) linear-axial configurational model; b) centric configurational model (Source: Authors)

other lines, but always return to the trunk. The second is the principle of a through episode, from which side lines also depart, but there is no main through-line-trunk (Figure 3).

A common variant of such a *circular cycle* is a composition built on the parallel or cross action of the so-called *"braid"*. In this case, the story is told halfway through, rushed, and then closed at the end of the film. This is a difficult form for cinema. Several equivalent storylines with different characters take place in the same place or at the same time. A *frame composition* and *"braid"* are a departure from the main highway, the turn to neighboring streets and alleys, but always returning to the main road. This type of composition is especially typical for city residents with service facilities "on the go", where the deviation from the route will be insignificant, or for a tourist who departs from the main route, chooses another part of the city to explore and then returns to the starting point again (Figure 7).

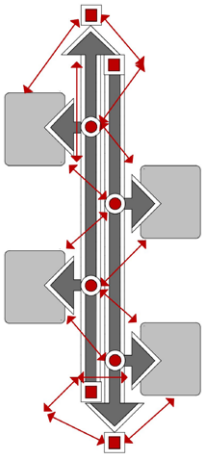

Figure 7. The composition of public space, built on the parallel or cross movement of the so-called "braid" (Source: Authors)

The fourth concept of time is *multidimensional time*, i.e., our psychological time, when we experience, remember, think, and constantly move from one to another. This is how we constantly walk through time in our minds. Based

on the concept of multidimensional time, a fragmentary composition is built. As a rule, it contains several short stories that are confused, or placed in an arbitrary order.

The most complex type of story composition is a *rhizomatic composition*. "Rhizome" is a botanical term that means a sprout that can grow from any point on the rhizome. In this case, there is no linearity; instead, there is an expressive structure "root – trunk – branch – leaf". According to Korshunov (2015), "rhizomatic constructions are constructions where there is no beginning and end, where the point of entry into history and the point of exit from it are completely destroyed".

A rhizomatic composition is a structure without a precise entrance and exit from the environment. It is the entire urban territory as a whole complex structure consisting of multi-purpose territories, connected or, on the other hand, divided by highway lines or streets of various purposes. This is a higher level that is important not for a specific resident, but for the totality of residents of the entire city and all their contacts as a single complex organism (Figure 8).

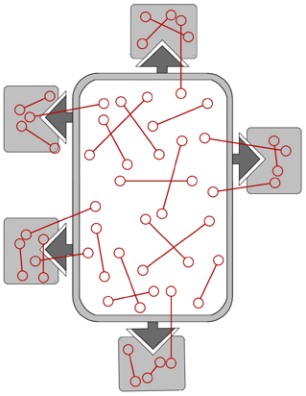

Figure 8. A rhizomatic composition based on a centric configurational model of public space
(Source: Authors)

Note that linear-axial and centric configurational models of public space, as well as their varieties, are the basis for a non-linear plot and linear compositions. All of them involve temporary departures from the main line of movement, its interruption, departures to side spaces (parallel storylines) and a return to the central core or to the main route (Figure 9). In addition, the constant possibility to return to a certain meeting place creates the conditions for so-called "serendipity", i.e., a happy unexpected event. Serendipity is a component of happiness; it is what enhances social experience and life in general. Increasing the feeling of happiness is a problem that hundreds of sociologists have been working on. It turns out that happiness lies in the topology and configuration of urban space. Integrating space enhances its intuitiveness, and architects and designers become wizards using this tool (Oliynyk, 2020).

Thus, the structural elements of film composition and the features of those elements can be used to analyze the architectural environment in order to study its plot structure. The plot structure of the architectural environment of the city is understood as its urban planning structure, which, like in cinematography, can develop linearly – from the

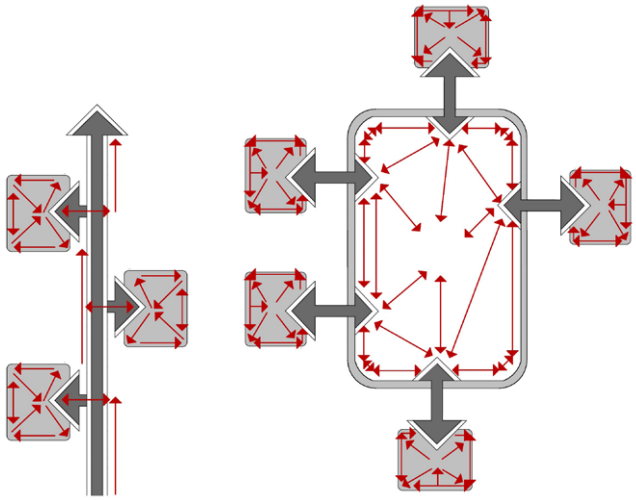

Figure 9. A rhizomatic composition based on a centric configurational model of public space
(Source: Authors)

beginning of the route to the end point along one street line, or be more complex (non-linear), whereby all elements are placed in an arbitrary order. As in the cinema, where the images on the screen move and there is movement of the plot, movement in the architectural environment is the main condition for its full perception. Moreover, as a rule, the movement of the plot of the architectural environment is discontinuous, which is due to the loss of valuable architectural, objects and even parts of the urban structure, or the stops of the viewer during his or her movements in the architectural environment.

In cinematography, the idea of the film, the main function of which is the structural organization of the story, organizes the movement of the plot and sets the formula for the finale. Meanwhile, in the architectural environment, a person moving through the city perceives the environment from the starting point to the final point through the spatial-temporal aspect that has developed historically, and the idea the architectural and artistic image of the city stands out here.

Basic theoretical models help in the analysis of the configurational structure of spaces as they describe the hidden mechanisms of building objects. Models are built according to the following conditions: formal spatial units are selected as objects – types of spaces – corresponding to specific spatial objects (rooms, corridors, fragments of streets, squares, etc.); limits of variation of selected types are defined; connections between spatial elements and their configurations characterizing the type of spatial interaction are determined; and the rules of the transition from the formal model, which describes the structural characteristics of the object, to its object implementation (use and preservation strategies) are defined. This kind of rule defines a "code" (or algorithm) in its totality, in which the individual characteristics of an architectural object are concentrated, reflecting the properties of its geometric dismemberment and spatial connection of elements.

The practical significance of studying configuration (the structure of interrelationships) lies in the determination of variations in the availability and use of spaces and their

corresponding transformation, which involve various types of activities, directions of preservation, methods of interpenetration of spaces, environmental design, placement of amenities, information, etc. The configuration of spaces depends on the nature of the activity and the directions of movement of people, and therefore the use of the spatial form. The composition of film plots, both linear and non-linear, can be found in all varieties of linear-axial and centric configuration models of public spaces.

DISCUSSION

This study is based on the statement that the architectural environment can be explored by cinematographic methods combined with the methods of spatial syntax. The cinematographic methods make it possible not only to shape the environment, but also to program impressions in it and to achieve a certain emotional color. The methods of spatial syntax help analyze not only the structure of public spaces, but also the relationships between the main and adjacent spaces. A person moving along a straight street in a seemingly determined, fixed direction always understands that he/she can leave this straight line at any moment. This confidence is based both on visual transparency and on the real accessibility of adjacent spaces. The ability to choose other parallel streets or other tangential spaces, in the language of cinema – to choose other storylines, to leave and return to the central part an infinite number of times – reveals the configuration of the architectural space of the city, and along with it, the behavior of people in it.

We assume that by manipulating the configuration of the urban space, by correctly placing architectural accents and compositional dominants that correlate with the role of the hook points in cinematography, according to the definition of Sid Field (2007), it is possible not only to build a scenario of perception of the architectural environment, but also a scenario of its functional use in different seasons and times of the day, depending on the urgent needs of the residents. It is possible that the space formed according to the principle of a film script can also have a specific genre color, for example, dramatic or comedic. All these assumptions require our further scientific research and their approbation in project practice.

CONCLUSIONS

As a result of studying the plot composition of a film, we came to the conclusion that its structural elements and their features can be used to analyze the architectural environment, in order to study its plot structure.

The plot structure of the architectural environment in a city is understood as its urban planning structure, which, like in cinematography, can develop linearly, i.e., from the beginning of a route to the end point along one street line, or be more complex (non-linear), whereby all elements are placed in an arbitrary order.

As in a movie, in which images on the screen move and there is a movement of the plot, movement in the architectural environment is the main condition for its full perception. In addition, movement of the plot in an architectural environment is usually discontinuous, which is due to the loss of valuable architectural objects, and even parts of the urban structure, or the stops of the viewer during his or her movements in the architectural environment.

In cinematography, the idea of the film, the main function of which is the structural organization of the narrative, organizes the movement of the plot and sets the formula for the finale. At the same time, in the architectural environment, a person moving through the city perceives this environment from the starting point to the end point through the spatio-temporal aspect that has developed historically, and here the idea of the architectural and artistic image of the city stands out.

Therefore, our further research will be related to the definition of urban planning elements and architectural objects, which at the semantic, morphological and syntactic levels mean anchor points of the plot of the architectural environment of the city, which force a person to change his or her movement.

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REFERENCES

Council of Europe (1986). *Recommendation Council of Europe No R(86)11 "Of the Committee of Ministers to Member States on Urban Open Space"*. Brussels: Council of Europe [online]. https://rm.coe.int/09000016805101ab [Accessed: 18 May 2023].

Domin, N. M. (2012). Gorodskie aglomeratsii v kontekste issledovaniya fenomena form i sistem rasseleniya (in Russian), *Urban Development and Spatial Planning*, Vol. 45, No.1, pp. 3-15. http://repositary.knuba.edu.ua//handle/987654321/10364

Field, S. (2007). *Script – the basics of screenwriting*. New York: Random House Publishing Group.

Hillier, B. (2007). *Space is the machine. A configurational theory of architecture*. London: Space Syntax.

Hillier, B., Tzortzi, K. (2006). Space syntax: The language of museum space. In: Sh. MacDonald (Ed.), *A Companion to Museum Studies*, London: Space Syntax, pp. 282-298. https://doi.org/10.1002/9780470996836.ch17

Kopteva, G. L. (2009). *The semantics of the "threshold" in the architectural rhythm of the urban environment.* Kharkiv: National University of Urban Economy named after O. M. Beketov.

Korshunov, V. (2015). *Types of non-linear scenario composition*. Odesa Film Studio [online]. https://www.odesafilmstudio.com.ua/uk/news/archive/vidy-nelinejnoj-kompozitsii-stsenariya [Accessed: 18 May 2023].

Manovich, L. (2001). *The language of new media*. New York: MIT Press Cambridge.

Oliynyk, O. P. (2020). *Theoretical and methodological foundations of the formation of urban public spaces*. Kharkiv: Kharkiv National University Construction and Architecture.

Oliynyk, O. P. (2021). Spatial syntax as a tool for studying the structure and configuration of public spaces, *Urban Development and Spatial Planning*, Vol. 76, pp. 195–204. https://doi.org/10.32347/2076-815x.2021.76.195-204

Royal Danish Academy – Architecture, Design, Conservation,

UIA Sustainable Development Goals Commission, UIA World Congress of Architects 2023 (2020). *An Architecture Guide to the UN 17 Sustainable Development Goals*, Vol. 2, Copenhagen: Royal Danish Academy [online]. https://issuu.com/kadk/docs/aechitecture_guide_un17_vol.2_web_single_pages [Accessed: 18 May 2023].

Tranchik, R. (1986). *Finding Lost Spaces. Theories of Urban Design*. New York: Van Nostrand Reinhold Company.

Troshkina, O. (2015). Teatralizatsiia arkhitekturnoho seredovyshcha yak psykholohichna potreba liudyny (in Ukrainian), *Theory and Practice of Design*, Vol. 15, pp. 156-161.

Troshkina, O. A. (2016). Kinematohrafichnyi pryntsyp montazhu v pobudovi stsenariiu spryiniattia arkhitekturnoho seredovyshcha (in Ukrainian), *Problems of urban development*, Vol. 2, No. 16, pp. 194-204.

Troshkina, O. A. (2017). Hranytsi kinokadru ta «pryrodnoho» kadru pry spryiniatti arkhitekturnoho seredovyshcha (in Ukrainian), *Problems of urban development*, Vol. 1, No. 17, pp. 158-171.

Troshkina, O. A. (2020). Siuzhetna struktura kinofilmu ta arkhitekturnoho seredovyshcha, *Problems of urban development,* Vol. 1, No. 24, pp. 136-152.

United Nations (2020). *Transforming our world: the 2030 Agenda for Sustainable Development,* New York: United Nation [online]. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf [Accessed: 18 May 2023].

Received April 2023; accepted in revised form September 2023.
First published: 18 October 2023.